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Appendix

Methodology, Concepts and Confidence in the Estimates

Methodology

CIA's estimates of Soviet defense spending are based primarily on direct costing—that is, first identifying individual components of the Soviet defense effort and then calculating the costs of each. From all-source intelligence and from US Intelligence Community judgments (presented in National Intelligence Estimates and other publications) we compile a detailed list of the activities and physical components which make up the Soviet defense program for a given year. This list includes data on order of battle, manpower, production of equipment, construction of facilities, and operating rates for the Soviet military forces. []

By a variety of methods this data base is converted into monetary estimates. For many components the data are costed directly in rubles—this method is suitable for military personnel; RDT & E; construction; procurement of hull, propulsion, and machinery components of naval surface ships; and some operation and maintenance expenditures. (For this report, about half of Soviet defense spending for 1979 was estimated directly in rubles.) For the remaining components, we first estimate what it would cost to carry out the Soviet activities in the United States and then convert these dollar costs to ruble terms. The conversion factors are based on samples of prices of Soviet military equipment and activities, obtained from human and technical intelligence sources. Our price samples have increased in number significantly in recent years; we now have, for example, prices for nearly one-third of the military procurement programs whose costs between 1965 and 1979 exceeded 1 billion rubles. []

Where possible, the ruble estimates derived from this technique are checked for reasonableness against other intelligence information or against Soviet statistics. []

For two of the main categories of defense spending—investment and operating expenditures—prices and quantities are estimated separately for each major activity and component. We cannot, at present, apply

this approach to the third category—RDT & E. The cost of military RDT & E, which is the weakest part of our estimate, is derived by another method—analysis of Soviet information on expenditures for science. []

Concepts

Our methodology is intended to provide an estimate of the level of, and an indication of the real trend in, the annual Soviet resource commitment to military forces. We use ruble prices to reflect as accurately as possible the relative prices of military programs and activities within the Soviet economic system. The estimates can be used to assess the resource constraints confronting Soviet military planners, the priorities they assign to the components of the defense effort, and the impact of defense programs on the Soviet economy. []

For assessing the trends of the Soviet defense effort and the priorities of the various components within that effort, we use estimates of “established prices”—the actual prices paid by the Soviet Ministry of Defense for goods and services. For example, our estimates of total defense spending and of spending by the individual military services are based on established prices. In the Soviet economy, however, prices are established administratively, not by market forces. Consequently, they are less accurate in reflecting relative scarcity and value than prices in a market economy would be. As a result, these established prices give a misleading picture of the real economic impact of Soviet defense activities. []

In order to improve the validity of ruble prices for economic analyses—for example, in calculating the defense share of GNP—we adjust our established-price ruble valuations so that they more nearly reflect the real allocation of resources in the Soviet economy.

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This procedure is called a factor cost adjustment.¹⁵ When the direct-costing estimate of defense expenditures has been adjusted to factor cost, it can then be compared with other estimates of Soviet economic performance made in factor cost terms. []

The estimates in this paper are presented in constant prices so that they reflect real changes in defense activities, excluding the effect of inflation. The base year is 1970. We use 1970 as a price base for several reasons:

- Other CIA measures of Soviet economic performance (such as estimates of GNP) also use a 1970 price base.
- Our samples of ruble prices for military equipment cluster around the year 1970. Our understanding of price inflation in the defense sector is too fragmentary to permit us to move these prices with confidence to a later base year.
- The Soviets undertook in 1967 a major price reform intended to make prices more representative of real resource costs. Implementation of the reform was essentially complete by 1970. []

Our data differ from data that the Soviets would use in two ways. First, our definition of defense activities and our categories of expenditures are different. For accurate understanding, in this type of study, we would prefer to use Soviet military and economic concepts and definitions, but we are prevented from doing so by gaps in our knowledge and in our ability to distribute the components of defense spending by Soviet categories. For example, a Soviet planner probably would be able to break down RDT&E expenditures by military service or by mission; we cannot now do this. []

Second, and more important, Soviet planners would use a different price base. The Soviets present their economic data either in the prices prevailing in each year (current prices) or in what they call comparable prices for a given year. The Soviets' comparable prices are intended to show trends in real terms, but they are constructed differently from Western-style constant

¹⁵ For a detailed discussion of the procedure, see *USSR: Gross National Product Accounts, 1970*, A (ER) 75-76, November 1975, (u)

prices and often display quite different growth trends.¹⁶

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Thus, the perceptions the Soviets draw from their own data may differ from the analysis in this paper in ways that are hard for us to determine. We do know, however, that although their measures of overall economic performance differ from ours in concept and price base, they too perceive a slowdown in their economy (see table 3). Similarly, Soviet perceptions of the economic impact and priorities of their defense programs probably differ from ours in detail. But the planners clearly are aware that the defense effort has had a substantial effect on their economy and that this effect is likely to increase. []

Confidence in the Estimates

The estimates presented in this paper reflect a continuing effort to acquire more and better data and to improve our methods. During the past year we have acquired additional ruble prices for military equipment, especially electronic equipment. New information and analysis has greatly improved our estimates of Soviet military pay and aircraft maintenance. These advances—coupled with improvements over the past several years in our estimates of the costs of Soviet military petroleum, oil, and lubricants and of equipment maintenance—have increased our confidence in the estimates. Even so, the margin of error for some items may be substantial. []

We have greater confidence in our estimates for total defense spending than in those for any of the individual subaggregates. On the overall level of Soviet defense spending in the 1969-72 period and on its rate of growth, we have two intelligence sources who provide some independent support for our estimates. One is a former Soviet economist, who reported that in 1970 he had seen a classified document at the USSR Central Statistical Administration which included a summary accounting of actual defense expenditures for 1969 and estimated figures for 1970 (based on data for the first six months of that year). He remembered total figures

¹⁶ For a discussion of Soviet pricing concepts and changes in prices over time see *Inflation in Soviet Industry and Machine-Building and Metalworking (MBMW) 1960-1975*, SR M 78-10142, July 1978, (u)

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Table 3

Comparison of Western and Soviet Measures of Soviet Economic Growth

Western Measures (based on CIA estimates in constant 1970 prices)	Average Annual Rate of Growth (percent)		Soviet Measures (based on Soviet data in "comparable" prices)	Average Annual Rate of Growth (percent)	
	1965-75	1975-78		1965-75	1975-78
Gross national product (factor cost) ¹	4.6	3.6	National income produced ¹	6.7	5.1
Final output of industry ²	6.1	3.8	Gross value of output of industry ²	8.0	5.1
Final output of machine building and metalworking ²	7.6	5.9	Gross value of output of machine building and metalworking ²	11.7	9.1

¹ On the difference between GNP and national income, see *USSR: Toward a Reconciliation of Marxist and Western Measures of National Income*, ER 78-10505, October 1978.

² The Soviet gross value of output for any given sector differs from the Western final output by including the sector's sales to itself.

This table is Unclassified.

of 47-48 billion rubles for 1969 and 49-50 billion rubles for 1970. These totals fall within the range of our estimates for those years, under the broad definition of defense spending. []

The other source is General Secretary Brezhnev, who is reported to have said in 1972, "I simply am afraid for our people to know that every third ruble in the state budget goes for defense." One-third of the total 1972 Soviet state budget was between 57 and 58 billion rubles. Taking inflation into account, this is within the range of our estimate (stated in constant 1970 prices) for total defense spending in 1972 under the broad definition []

Because the direct-costing methodology is based on observation and therefore reflects the actual changes observed in Soviet defense activities over time, we are confident that the upward trend in these estimates is correct. We have greater confidence in this general trend than in our estimates of changes from year to year (each year's estimate is sensitive to our judgments regarding the phasing of costs for major long-term procurement programs). Over the past 15 years, the average annual rate of growth in Soviet defense spending (in terms of our constant price concept) has probably not been significantly higher or lower than

the 4 to 5 percent implied by our estimates. The information from the two independent sources cited above, when adjusted for inflation, also implies a 4- to 5-percent growth rate in Soviet defense spending from 1969 to 1972. []

Our confidence in the estimates at the lower levels of aggregation varies from category to category. We have the highest confidence in our estimates of personnel costs, which are based on an extensive knowledge of the Soviet military pay system. We also have substantial confidence in our estimates of military procurement, especially for naval ships and for missile and aircraft systems. Construction of surface ships is easily observed, and we can estimate their costs directly in rubles, using Soviet data which we have found to be reliable. We make our initial estimates for missiles and aircraft in dollars, but the factors we use to convert these estimates to ruble terms are based on our largest and most reliable samples of ruble prices. We have less confidence in our cost estimates for construction and for the operation and maintenance of weapon systems (though our current operation and maintenance estimates are substantially better than those of previous years). []

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We are least confident of the estimates for Soviet military RDT&E, which we derive in the aggregate on the basis of a methodology which is less certain than those we employ for estimating Soviet investment and operating spending. The level and trend of our estimate, however, are consistent with our judgments (made with high confidence) that the military RDT&E effort is large and that the resources devoted to it are growing. Moreover, we do have evidence on the manpower and physical facilities devoted to military RDT&E programs, and this evidence supports our view of a large, and increasing, resource commitment [redacted]

Problems in Projecting Defense Spending

Our projections of future Soviet spending for defense are less certain than our estimates of spending in past years. This is due in part to general uncertainties about the future Soviet economic, strategic, and political environment and in part to more specific uncertainties about the size of future forces, the numbers and types of new weapons to be deployed, and the weapons' physical and technical characteristics. Even greater uncertainties surround our estimates of the costs of future weapon systems, which are closely related to technical characteristics. The Soviets go to great lengths to deny us these technical data. The difficulties inherent in forecasting the future Soviet RDT&E effort compound the uncertainty in our estimates [redacted]

Despite these difficulties, we do have a reasonable basis for an assessment of the future:

- Our estimates of past Soviet defense spending.
- The evidence gathered in preparing those estimates.
- The trends revealed by them.
- Our understanding of the factors the Soviet leaders consider in making their decisions on resource allocations.

On this basis, we believe that we can forecast general trends in defense spending for the next year or two with substantial confidence and for four or five years with somewhat less confidence. We have little confidence in projections beyond five years because of the difficulties inherent in projecting individual defense programs, to say nothing of the problems in anticipating Soviet decisions on defense resource allocation in the changing political and economic situations of the 1980s. For this reason, the discussion of future defense spending in the text is for the most part limited to the period from now through 1985. [redacted]

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